

## CLAIMS

What is claimed is:

1. Thermoelectric module, comprising: a plurality of thermoelectric materials with opposed polarity connected by a first and a second conductive element wherein such thermoelectric materials are configured according to respective coating layers applied on at least one of the conductive elements.
2. The module according to claim 1, wherein said coating layers have a thickness equal or less than 1  $\mu\text{m}$ .
3. The module according to claim 2, wherein said coating layers have a thickness of about 0.1  $\mu\text{m}$ .
4. The module according to claim 3, wherein said coating layers coat respective surface portions of the conductive element, having substantially the same area.
5. The module according to claim 1, wherein said coating layers are respectively made of platinum and tellurium.
6. The module according to claim 1, wherein said coating layers are respectively made of platinum and selenium.
7. The module according to claim 1, wherein said coating layers are respectively made of platinum and nickel thereby providing, further to a thermoelectric effect, also a catalyzer effect on the exhaust of internal combustion engines.
8. The module according to claim 1, wherein said coating layers are respectively made with a Ni-Cr alloy doped with C, Si, Fe, and a Ni-Cu alloy doped with C, Si, Mn, Cr, Fe, S.
9. The module according to claim 1, wherein said conductive elements are straps made of copper, aluminium or other conductive metal, and wherein the coating layers coat one face of the relative strap.
10. The module according to claim 9, wherein the straps are kept pressed one against the other thereby providing a good contact between at least one of the coating layers and the other strap.
11. The module according to claim 9, wherein the straps have the shape of a parallelepiped.
12. The module according to claim 9, wherein the strap has a thickness less than 10 mm.
13. A thermoelectric generator, comprising: a plurality of modules which include a first conductive strap with a face coated by layers of thermoelectric material having opposed polarity, and a second conductive strap for the electrical connection of such layers, wherein the second

strap is juxtaposed to the first strap so as to connect one of the thermoelectric layers thereof with the layer of opposed polarity of an adjacent strap, thereby connecting in series the respective modules.

14. The generator according to claim 13, wherein the second strap is not coated with thermoelectric layers.

15. Generator according to claim 13, further comprising means for heating and/or cooling the straps

16. Generator according to claim 15, wherein the means for heating and cooling the straps comprises respectively the condenser and the evaporator of a refrigerating apparatus.

17. A thermoelectric generator comprising a plurality of conductive straps which have a face coated with thermoelectric layers of opposed polarity, stacked one upon the other.

18. The generator according to claim 16, wherein the straps are stacked in an offset condition with their ends protruding from sides of the piles.

19. The generator according to claim 17, comprising means for heating and/or cooling the straps.

20. Generator according to claim 19, wherein the means for heating and cooling the straps comprises respectively the condenser and the evaporator of a refrigerating apparatus.

21. A thermoelectric generator, comprising: a plurality of modules which include a first conductive strap with a face coated by layers of thermoelectric material having opposed polarity, and a second conductive strap for the electric connection of such layers, wherein the second strap is juxtaposed to the first strap so as to connect one of the thermoelectric layers thereof with the layer of opposed polarity of an adjacent strap, thereby connecting in series the respective modules, wherein said modules are applied on a rod of spent nuclear fuel.

22. The generator according to claim 21, wherein the straps are applied on the rod of spent nuclear fuel by means of a cement electrically insulating and thermally conductive.

23. The generator according to claim 22, wherein the rod with the modules applied thereon is wrapped in an impermeable wrapping from which electric wires come out.

24. The generator according to claim 23, wherein the wrapping is made from said cement poured onto the outer surface of the thermoelectric modules and the ends of the nuclear rod.

25. The generator according to claim 23, wherein the rod with the modules and the wrapping applied thereon, is immersed in water.

26. The generator according to claim 24, wherein the cement is Sauersen Electric Cement N. 78.

27. The generator according to claim 21, wherein the straps have a parallelepiped shape and are tangentially applied on the rod.
28. The generator according to claim 21, wherein the cross sections of the straps have the shape of ring sectors coaxial with the rod on which they are applied.